is the correct one with the addition of the part played by the middle laryngeal nerve; (3) the crico-thyroid muscle is innervated by both the superior and middle laryngeal nerves; (4) all the other muscles are supplied by the recurrent laryngeal; this distribution is unilateral, save perhaps for the arytenoid muscle. Chapter II. of his research takes up the question of the motor fibers of the vagus and spinal accessory and the relative part played by each in the innervation. His conclusions reached after an elaborate argument, historical, physiological and pathological, are (1) that interrachidian tearing of the spinal accessory nerve is followed by Walerian degeneration in the corresponding inferior laryngeal nerve only, and a limited number of its fibers at that, from which he concludes that the superior laryngeal and some fibers of the recurrent are derived from the pneumogastric; (2) isolated rupture of the bulbar roots of the pneumogastric is followed by immediate cessation of the respiratory movements of the corresponding vocal cord, and stimulation of the common trunk of the vagus, in these animals that had survived for a period of three weeks the intracranial rupture of the spinal accessory, gives rise to movements of the glottis. On the question of the bulbar centers de Beule claims that the dorsal vago-spinal accessory nucleus is the nucleus for the innervation of the larynx. The ganglionic centers for the motor fibers of the superior laryngeal nerves are in the lower two-thirds of the dorsal nucleus of the pneumogastric, in which region portions of the cells of origin of the recurrent laryngeal are also found. The spinal accessory is located in the upper three-fourths of the same nucleus.

8. *Gemmules.*—Soukhanoff continues his studies on gemmules, in one instance using the spinal cord of the guinea pig. He finds gemmules on some of the cell bodies of the spinal cord. In an old animal the gemmules were so numerous that they completely covered the cell outline between the dendrites. In newborn children he has found them, and in the posterior horns of an adult of fifty-two years. He holds that they are not artefacts, but contributes nothing new concerning their possible function.

JELLIFFE.

MISCELLANY.

A CASE OF TUMOR OF THE CAUDA EQUINA. Franz Volhard (Deutsche med. Wochenschrift, xxviii. 33, 1902).

The author reports a rare case, and one which is of importance for topical diagnosis. The patient, a male, and a teacher by occupation, observed early in the year 1898 that he was obliged to urinate more often and with more difficulty than usual, and that much more voluntary effort was required during defecation. In the same year a peculiar feeling of pressure manifested itself at the lower extremity of the spine, which persisted. In 1899 impotence occurred; in the summer the left foot began to waste as well as the leg, and the fatigue in the extremity caused the patient to limp. There never was any pain in the limb. The dull feeling of pressure above mentioned still persisted and became aggravated upon bending the body, coughing, climbing stairs, and upon pressure, although there was never a definite appreciation of pain. In 1900 the symptoms gradually increased. The left leg felt heavier, and the movements of the toes ceased. After treatment in one of the German watering places during 1901 the patient felt considerably better. He could walk much better, the bladder could be emptied with much more ease, and the impotence markedly decreased. This improved condition continued for almost three months until the end of the year 1901, when the symptoms again became aggravated. In addition to the previous symptoms the patient became greatly annoyed by an excessive thirst, dryness in the mouth and nose, loss of appetite and nausea. The feces became so dry that the patient often had to extract them with the fingers. Examination of the patient showed the following: Above the symphysis the bladder could be palpated as a large tumor extending to the umbilicus. Examination of the internal organs of the thoracic and abdominal cavities showed nothing abnormal. The left leg, particularly the lower portion, was from 1 to 2 cm. thinner than the right, the left ankle joint relaxed, and the muscles of the calf limper than those of the right. There was no swaying with the feet in juxtaposition. The knee-jerk on both sides was very prompt, and the cremasteric reflex very pronounced. The Achilles reflex was only just perceptible on the right side, but could not be obtained upon the left. The plantar reflex was very much diminished on both sides. Examination of the hip-joints showed that on the left side external rotation was easily performed, yet markedly less than on the right side, while internal rotation could be forcefuly performed on both sides. Extension of the leg from the knee-joint could be easily performed on both sides, but flexion was weaker on the left side. Dorsal flexion of the feet was less pronounced on the left side. No zone of anesthesia could be detected. Only the most careful tests elicited here and there a diminished or absent appreciation of tactile impressions and in the following areas: (1) At the area corresponding to the sacrum, although the latter was not painful on pressure. (2) Directly above the knee on the left side. (3) A circular area at the external aspect of left leg. In these areas, both tactile and temperature appreciation were absent. There was no real pain, but a feeling over the sacrum described as "miserable, and pressing as if a wedge were being driven into the tissues." Electrical excitability was diminished quantitatively in the paretic muscles, but no reaction of degeneration could be obtained. The author calls particular attention to the fact that in this case the diagnosis was confined to a lesion of the conus or the cauda equina, based upon accepted topical diagnosis. The location of the lesion was of particular importance for therapeutic purposes. An appended table offers the explanation that the lesion could be inferred as existing either in conus or in cauda equina. Yet the absence of sensory irritability is in contradistinction to the symptoms in lesion of the cauda equina. But the diagnosis of a tumor of the cauda equina was made, because it explained the symptom-complex rather than individual symptoms, and because a tumor of the conus would have caused extensive symmetrical paralysis in such a time. It was intended to open the spinal column, but the general condition of the patient continued to grow worse until he died during a uremic attack. The autopsy showed a glioma directly under the conus, which not only crowded the posterior roots, but which compressed the anterior ones against the spinal column, therefore, also, explaining the slight sensory disturbances.

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